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Andrews Bridge System: An Excellent Treatment Modality For Replacement of Anterior Dento-Alveolar Defects.

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ABSTRACT: Facial appearance is most desired thing by any individual and at the same time it is most vulnerable to injuries being the most exposed part of the human body. The dento-alveolar defects comprise missing teeth along with its supporting alveolar bone and overlying soft tissue, leaving behind unesthetic smile and poor support to the facial soft tissue. Restoration options include bone grafting followed by implants/fixed tooth supported partial denture if edentulous span is small/removable partial denture or hybridprosthesis where best example is Andrew's bridge system which is a combination of fixed and removable prosthesis. This article highlights the rehabilitation process of a dento-alveolar defect using this treatment modality.

Key words: Andrew's Bridge, Bar Attachment, Class III Dento-Alveolar Defect, Dental Implants

I. INTRODUCTION

Reasons for dento-alveolar defects could be Cleft lip/palate, post-operative cyst/tumour site, oral-maxillofacial trauma or periodontal problems with excess bone loss. Patients with dento-alveolar defects often report to department of prosthodontics for replacement of missing teeth; however it is more than simply replacing teeth. Two important considerations in such cases are: dental esthetics while smile and soft tissue esthetics (adequate lip/cheek support).

Prosthetic options:

Fixed tooth supported partial dentures: it is most commonly selected option both by clinician and patient when edentulous span is small or alveolar loss is less. In an attempt to restore large defects, the prosthesis becomes too bulky and puts excessive load on supporting teeth and if bulk is not restored then it gives unaesthetic results due to insufficient labial support from inside. Where ever alveolar structure loss is more, in an attempt to place teeth in natural position, the pontic region becomes too labial to underlying mucosa and leads to a big step in cervical area which is prone for food lodgement. If slime line is high then it gives compromised smile also.

Dental Implants: bone grafting and soft tissue grafting are very common in an attempt to restore lost alveolar part followed by dental implant placement. It is most natural way to restore these defects but results are unpredictable and protocol is time consuming and expensive.

Conventional removable partial denture: it is most conservative way indicated for such cases. They can restore any amount of defect with good esthetics without altering the existing dentition.However, these prosthesis are not much liked by the patients because of their need of removal during night, big design, visibility of clasp, problem in speech and less retention.

These are often given during healing phase as interim prosthesisbefore planning a definitive replacement.

Hybrid prosthesis: these are a combination of both removableandfixed partial denture (aided with any kind of precision attachment). If the precision attachment with fixed component is a Bar type connecting one abutment at both terminus then it is called Andrew's Bridge system. The fixed bridge is made of one PFMcrown at both ends, fused to a pre-manufactured bar that are permanently cemented to the prepared abutment. The removable portion includespontic area and is made in cast partial denture or acrylic heat cure resin partial denture and is incorporated with metal sleeve/housing and a clip. This clip snuggly fits over the underlying barfor retention. Advantages include: excellent retention, patient gets feeling of fixed kind of prosthesis, easy to clean, cost effective, conservative when compared to fixed tooth supported partial denture.

II. CASE REPORT:

49 years old female patient reported to department of prosthodontics with chief complain of unpleasant smile. She had a history of RTA 3 months back in which she lost her upper front teeth. Extra-oral examination revealed the lackof lip support (Figure 1). Intra-oral examination showed missing 11,12,13,14 and their associated alveolar structure (Seibert's class III defect). 15 and 16 were root canal treated. This case was an ideal indication for Andrew's bridge system.

Procedure (Figure 2)

Step 1: (Fixed component fabrication) crown preparation done on 21,15 and PFM crowns on 21,15 connected with bar(using pre-formed OT Bar Multiuse, Rhein 83) during casting procedure.A separate crown on 16 was fabricated. After checking for esthetics, occlusion these were cemented with luting glass ionomer cement. (Figure 3)

Step 2:(Removable component fabrication) after blocking under surface of Bar with modelling wax, impression was made in polyvinyl siloxane material.

Modification in conventional Andrew's bridge system design:A metal major connector was planned with diagonal extension in second quadrant for providing additional tissue support, indirect retention under oblique forces and most important a cross arch stabilisation. Inclusion of these factors in conventional design significantly reduced damaging effects of eccentric forces on terminal teeth.

After proper block-out on master cast, firstly permanent record base was fabricated in heat cure resin on metal frame in edentulous area. A circumferential clasp was incorporated around 27 for retention purpose. After finishing it was checked for adaptation intra-orally. After satisfied trial a window was created for attachment of metal housing–nylon clip assembly over underlying Bar. After a passive seating of denture base, cold cure acrylic resin was used to attach metal housing with the denture base (direct method). Teeth arrangement was done with slight mal-alignment to give a mirror appearance to opposite quadrant using dentogenic concept (Figure 3). After clinical trial, the prosthesis was processed in heat cure acrylic resin in artificial teeth region. Final finished prosthesis was checked for esthetics and occlusion (Figure 4). Patient was demonstrated about insertion and removal of prosthesis and with instructions about its cleansing and maintenance.

III. DISCUSSION:

Dr. James Andrews of Amite, Louisiana firstintroduced the fixed removable Andrew's system (Instituteof Cosmetic Dentistry, Amite, L.A.) in 1975[7]. This concept is still viable in dentistry because of its advantages over other treatment modalities, patient acceptance and ease of fabrication. Excellent retention can restore esthetics, phoneticsand mastication to the maximum.

The connecting bar provides splinting effects also to the terminal abutments apart from providing retention for the prosthesis, so even periodontally compromised teeth can also be used with good success rate. Few shortcomings in conventional designs are: Firstly, in conventional design only missing portion is fabricated as a removable partial denture. It is completely supported over bar with very less support on underlying edentulous alveolar part. Bio-mechanically it puts excessive vertical and offset load terminal teeth holding attached bar. Secondly, clip also tends to loosen under these forces and require frequent replacements in order to maintain good retention. Thirdly, the tissue prosthesis surface contact on lingual or palatal aspect is very abrupt and often leads to food impaction during mastication which is very sometimes inconvenient for the patient. Continuous plaque retention can lead to tissue proliferation under prosthesis or candida infection or dental caries to the terminal abutments. In this present case removable cast partial denture was designed with some modifications in order to overcome these short comings in conventional design.A metal major connector was incorporated for making it tooth-tissue born for better forces dissipation, for cross arch stabilisation and for minimizing plaque retention under tissue surface by direct food lodgement during mastication.

IV. CONCLUSION:

Anterior dento-alveolar ridge defects are difficult to rehabilitate and Andrew's bridge system is a good option when compared with conventional tooth supported fixed or tissue supported removable partial denture. Dental implants if possible can be the best mean to replace missing part but it has its own limitations. Owing to these facts, Andrew's bridge system is still an viable option in prosthodontics.

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Patient photographs:

Figure 1: pre-operative extra-oral view

Figure 2: fabrication steps of Andrews Bridge components

Figure 3: Removable component of Andrews bridge system

Figure 4: pre and post-operative extra-oral view

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